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## THE FLORENCE PILKINGTON MANCHESTER MEMORIAL COLLECTION

There has recently been placed on exhibition in a room on the main floor of the Public Library at Fall River, Massachusetts, a fine collection of minerals. It is attractively displayed in six sloping-top glass cases, with bronze frames of gun-metal finish. The specimens are mounted on heavy buff-colored cardboard, and arranged according to Dana's System of Mineralogy.

This exhibit represents a part of the Florence Pilkington Manchester Memorial Collection of Minerals, which has been donated to the city by Mr. James G. Manchester, of New York, a former resident of Fall River, in memory of his wife, who died about two years ago. The collection comprises in all some 3000 specimens, having been accumulated by Mr. Manchester during a period of nearly thirty years. Specimens from many localities thruout the world are included, but it is particularly rich in zeolites and the associated minerals from New Jersey, and in unusual semi-precious stones from New York and New England localities. Especially noteworthy are the minerals from the Bergen Archways, including the finest suite of datolite crystals ever found, crystals completely and symmetrically developed, colorless, transparent and lustrous, looking almost like artificially cut gem-stones; the golden beryl, spessartite garnet, and other gems from New York City; asteriated rose quartz from Bedford, New York; and a recent find of citrine quartz, from Portland, Connecticut.

Several of the minerals in the collection have already been described and figured by Mr. Manchester in this magazine,<sup>1</sup> and he has had cuts made of a few of the choicest specimens, and generously given us the opportunity to publish them; the first appears opposite, and others will be printed later. E. T. W.

<sup>1</sup> Vol. 2, 85-86, 1 plate, 1917; vol. 3, 169-174, 2 plates, 1918; vol. 4, 107-116, 4 plates, 1919; and plates 2, 4, 7, 9, and 10 of vol. 4.

SKUTTERUDITE FROM COBALT, ONTARIO<sup>1</sup>

T. L. WALKER

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On some specimens recently obtained from the Temiskaming mine, Cobalt, Ontario, small brilliant crystals resembling smaltite were observed, imbedded in fragments of soft chloritic or micaceous country rock included in the vein. As is well known, smaltite and chloanthite closely resemble one another and are commonly intergrown in the same crystal. It was with a view to determining the relative purity of the supposed smaltite that this examination was undertaken.

The principal ore in the vein is smaltite, usually massive, but occasionally forming rough crystals up to 5 or 6 millimeters in diameter. The rest of the vein matter is either calcite or fragments of country rock. The small crystals under investigation seem to represent the latest mineral to form; they are tin white, and very lustrous. The specific gravity, determined on 0.62 gram of carefully selected crystals, is 6.79, which is closer to the value usually given for skutterudite ( $\text{CoAs}_3$ ) than to that for smaltite ( $\text{CoAs}_2$ ).

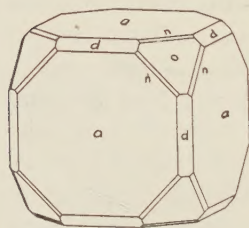


FIG. 1.

The crystals, which seldom exceed a millimeter in diameter, were measured on a Goldschmidt goniometer. The following forms were observed on each crystal:  $a(100)$ ,  $o(111)$ ,  $d(110)$ , and  $n(211)$ . The relative development of the forms is shown in figure 1. Nothing observed suggests that the crystals are hemihedral—the faces of the last two

forms were not always present in full, but the omissions appeared to be quite irregular. These four forms have all been observed on both smaltite and skutterudite.

An analysis made on the powdered mineral is shown in I.

<sup>1</sup> Presented at the first annual meeting of the Mineralogical Society of America, December 28, 1920. [That crystallinity is not necessarily a criterion of homogeneity has been demonstrated repeatedly in recent mineralogical work. In this paper fractional solution of the material, a method which is not used as often as it should be, is applied successfully to demonstrating the non-homogeneity of what might otherwise have been announced as a new species. Ed.]



The molecular ratio for (Co, Ni, Fe) to (As, S) appears to be nearly 2:5, so that from this analysis the composition would be well represented by the formula  $(\text{Co, Ni, Fe})_2(\text{As, S})_5$ . Remembering the work of Volkhardt<sup>1</sup> with reference to intergrowths of smaltite and skutterudite an attempt was made to determine, by dissolving part of the powder, whether it could be demonstrated that the soluble part had a different composition from the less soluble portion. Some of the same powder was treated with hot 50% nitric acid for three minutes, and water was then added to interrupt the action. About half the powder was dissolved. The insoluble part was weighed and the weight of the dissolved part was obtained by difference. The analysis of the soluble part is shown in II, the composition of the insoluble part (obtained by calculation) in III.

	I			II			III		
	%	Mol. Ratios		%	Mol. Ratios		%	Mol. Ratios	
Co...	20.57	.3506	.4149	20.89	.3558	.4504	20.18	.3437	.3784
Ni...	1.31	.0223		2.54	.0433		0.11	.0018	
Fe...	2.35	.0420		2.87	.0513		1.84	.0329	
S....	1.25	.0391	1.0367	.99	.0309	1.0017	1.50	.0469	1.0667
As...	74.72	.9976		72.71	.9708		76.38	1.0198	
Total.	100.20			100.00			100.01		

From the above molecular ratios it may be observed that the soluble part is most basic, and the insoluble part most acidic, thus:

Soluble portion	(Co, Ni, Fe): (As, S) :: 1:2.22
Original mixture	" " " 1:2.49
Insoluble portion	" " " 1:2.82

In Hintze's Mineralogie only one of the 55 analyses of smaltite-chloanthite contains as high a percentage of cobalt as the material here analyzed. In most of the cases, Hintze's analyses correspond to complex intergrowths of smaltite-chloanthite with a mineral containing a considerable excess of arsenic. In 39 of the 55 analyses the excess of arsenic (and sulfur) beyond the ratio required for a smaltite-chloanthite mixture is so great, that there must also be present some mineral more acid than those usually assumed. The most reasonable explanation is

<sup>1</sup> *Z. Kryst. Min.* **14**, 407-8, 1888. Also Beutell and others, *Centr. Min. Geol.* **1915**, 359-373; **1916**, 10-22, 49-56, 180-5, 206-21.

found in regarding such samples as composed of smaltite-chloanthite and skutterudite. The general distribution of the last named mineral in what has often been regarded as smaltite-chloanthite can scarcely be doubted.

Analyses of massive or nodular smaltite-chloanthite from the veins of Cobalt usually conform to the general formula  $RS_2$ , as brought out by the analyses reported by Miller,<sup>1</sup> which show: Co 16.7–19.8, Ni 4.5–7.0, Fe 6.2–8.9, As 60.3–63.5, S 4.1–7.0, insoluble, etc. 0–4.4%. The present case thus represents the peculiar situation of massive material having a composition nearer to the theoretical than crystallized material.

The results here brought forward confirm those of Volkhardt and of Beutell, that skutterudite and smaltite-chloanthite are capable of forming isomorphous intergrowths in all proportions, and the theoretically pure individual minerals are almost unknown. These minerals resemble one another so closely in physical properties as to be nearly indistinguishable, while crystallographically they show the same dominant forms,  $a(100)$ ,  $o(111)$ ,  $d(110)$ , and  $n(211)$ . They are probably all pyritohedral, altho in the case of skutterudite the hemihedral character is not so well established. The isomorphism of smaltite-chloanthite and skutterudite, minerals which do not possess similar chemical formulas, suggests in some respects the striking isomorphism of the minerals of the feldspar group.

## THE MINERALS OF ROCKPORT, MASSACHUSETTS

H. E. MCKINSTRY

*Cambridge, Mass.*

More than fifty years ago attention was called to the unusual mineral occurrences at Rockport, on Cape Ann, by J. P. Cooke's description of danalite, a new beryllium mineral, and subsequently of cryophyllite, a new lithium mica. Besides being the type locality for these species, the Rockport quarries have afforded an interesting list of rare-earth minerals, and, perhaps most unusual of all, large tabular crystals of fayalite, normally an utter stranger to granitic rocks.

*Geology.*—The country rock of Cape Ann is an alkali granite which forms a batholith having an exposure of some 25 kilometers in greatest diameter, and is cut by numerous dikes of diabase

<sup>1</sup> Miller, W. G., *Report, Bureau of Mines*, 19, pt. II, 17, 1913.



and of various types of porphyry. To the mineralogist, however, its most interesting features are the pegmatites which it encloses.

The granite is very similar to the famous commercial stone of the Quincy quarries, and like it, has been extensively quarried for building purposes. Chemically it is low in magnesium and calcium, and relatively high in sodium and potassium. It therefore falls near the syenite end of the granite series and is usually described as an alkali granite.

In composition the pegmatite is analogous to the granite, and is far from being an orthodox granite pegmatite. It lacks entirely the common tourmaline, garnet, muscovite, beryl and biotite. On the other hand, nephelite and sodalite, so characteristic of the alkali pegmatites, are also absent.

Not only is the pegmatite unusual in its mineralogical composition, but its mode of occurrence is also unique. Instead of appearing in dikes and sills as a well-behaved pegmatite should, it is found in irregular masses, roughly lens-like in form, and entirely surrounded by granite, so that when exposed on any face the pegmatite has the shape of a rounded or perhaps jagged patch framed in a border of granite, finer grained than the normal country rock. The "patches" are small, rarely over 4 or 5 dm. in diameter, and many show a rough zonal structure with feldspar near the periphery and quartz at the core. Large plates of black mica (lepidomelane) occur in the outer feldspar and marginal fine-granite zones.

Aside from these lens-shaped pockets, a less common mode of occurrence of the pegmatite is in narrow seams, few more than 2 or 3 cm. wide, and these seams show the same zonal arrangement as do the irregular pegmatite masses.

*Location and Present Condition.*—Rockport is best reached via the Boston and Maine R. R. from North Station, Boston. The principal localities are (1) the Flatledge quarry on the east or seaward side of the Cape, about fifteen minutes walk northward from the railway station on the road to Pigeon Cove; and (2) the Babson Farm quarry at the northern point of Cape Ann.

Unfortunately for collectors, no pegmatite is at present visible in place at either of these localities. The best collecting ground is a rock dump on the south crest of the Flatledge quarry, where large blocks of rejected granite show remnants of the pegmatite bodies. During last spring, when the locality was visited by the writer in company with Professor Palache, lepidomelane

was collected in plates up to 7 cm. in diameter, as well as cyrtolite, danalite, thorite, fluorite and molybdenite.

#### MINERALS REPORTED

*Albite.* See Feldspar.

*Amphiboles:* *Hornblende* occurs as a narrow black rim surrounding crystals of pyroxene and fayalite.

*Actinolite.* Occurs in radiating black crystals resembling the hornblende in color and luster.

*Anthophyllite.* Fibrous iron amphibole is found along the contact between fayalite crystals and the enclosing quartz and feldspar, where Warren<sup>1</sup> has shown it to be a reaction product between the basic fayalite and the siliceous minerals of the pegmatite.

*Astrophyllite.* Reported by Sears.<sup>2</sup>

*Calcite.* Film-like plates along cleavage planes of decomposed pyroxene.

*Chlorite.* A fine-grained black micaceous mineral forming stringers filling fractures in the feldspar and irregular cavities.

*Cryophyllite.* A variety of zinnwaldite containing lithium and fluorine was described by Cooke<sup>3</sup> from type material obtained at this locality.

*Cyrtolite.* "Hydrous zircon" in groups of brown, curved-faced tetragonal crystals, usually associated with shattered white quartz and granular black mica.

*Danalite.* Rockport is the type locality for this mineral, which, like cryophyllite was described by Cooke.<sup>4</sup> It occurs in small grains to large masses embedded in the pegmatite, and rarely showing crystal faces suggesting octahedral forms.

*Fayalite.* Large crystals of fayalite, the iron olivine, up to 20 cm. long and more than 3 cm. thick have been found in the pegmatite. The crystals are tabular in shape but with faces only roughly developed. Along their margins are radiating fibers of anthophyllite which form the reaction rim above alluded to. Grains of magnetite are segregated near the borders of the fayalite, frequently forming a nucleus for the anthophyllite fibers.

*Feldspars.* The feldspar of the pegmatite is chiefly micropertthite,—microcline and albite intergrown in varying proportions. In places the feldspars have the green color of amazon-stone and show prism and dome faces, particularly where surrounded by quartz. More commonly the feldspar is gray and somewhat platy with curved cleavage faces.

*Fergusonite.* This rare-earth mineral is found in irregular grains and narrow lens-like plates in the feldspar of curved-plate cleavage, and in graphic granite.

*Fluorite.* Anhedronal crystals of sea-green fluorite about 2 cm. in diameter are occasionally found embedded in the feldspar of the pegmatites. Purple

<sup>1</sup> Anthophyllite with fayalite from Rockport. *Am. J. Sci.* [4], 16, 339, 1903.

<sup>2</sup> Sears, J. H. *Phys. Geog., Geol., Mineralogy and Paleontology of Essex Co., Mass.*, 1905.

<sup>3</sup> Cryophyllite and Assoc. Minerals from Rockport. *Am. J. Sci.* [2], 43, 217, 230, 1867.

<sup>4</sup> Danalite, a new mineral from Rockport, *Am. J. Sci.*, [2], 42, 73, 1866.



fluorite is common in small grains and is usually associated with granular chlorite and metallic sulfides.

*Gadolinite*. A prismatic crystal 1 x 2 cm. imbedded in a "strained zone" of quartz, collected recently by Prof. Palache, corresponds closely to the description of gadolinite from Llano County, Texas, altho the careful qualitative analysis necessary for its positive identification has not yet been made. It is dark, lustrous and glassy, with conchoidal fracture, black in ordinary light, but green in thin fragments by transmitted light. The crystal is rounded in outline, with no well-developed faces, and is coated with a brick-red alteration product.

*Galenite*. Grains and small masses associated with sphalerite and danalite.

*Hedenbergite*. See Pyroxene.

*Hematite*. As small lustrous scales associated with phenacite and sphalerite in cavities resulting from decomposition of danalite.

*Hornblende*. See Amphibole.

*Lepidomelane*. The large plates of black mica that occur in the fine-granite zone and marginal feldspar have already been alluded to. The most striking occurrence, however, is in tabular masses with basal cleavage-plates up to 8 cm. in diameter and 4 cm. thick. These crystals are automorphic in feldspar and quartz, and have rather rounded edges. In another modification the lepidomelane occurs in compact masses of long, narrow pseudo-hexagonal crystals a few millimeters in diameter. Cyrtolite crystals are frequently embedded in this variety.

*Microcline*. See Feldspars.

*Molybdenite*. In flakes up to five centimeters in diameter, altho usually only a few millimeters. It seems to seek the marginal zones of the pegmatite bodies, where its characteristic occurrence is in the feldspar containing large lepidomelane crystals. It is commonly found in the so-called xenoliths of fine granite, which may or may not be associated with the pegmatite.

*Muscovite*. Small quantities of muscovite have been found, but it is distinctly a rarity and its primary origin has not been established.

*Orthite*. Reported by Sears.

*Phenacite*. In small crystals up to 5 mm. in diameter lining cavities resulting from the decomposition of danalite. This unusual paragenesis for phenacite has been described by Palache<sup>1</sup> in material from an abandoned quarry along the railroad track between Rockport and Gloucester.

*Pyrite*. Found occasionally in small grains with hornblende along the periphery of pyroxene and fayalite crystals.

*Pyroxene*. Hedenbergite occurs, in tabular brown crystals, flattened parallel to the front pinacoid. One twin crystal was noted which showed the basal cleavages meeting at an angle along the pinacoidal plane.

*Pyrrhotite*. Occurs sparingly with pyrite as described above.

*Quartz*. In graphic intergrowth with feldspar or in large smoky masses at the core of pegmatite bodies. Large masses from the Babson Farm Quarry show delicate bluish opalescence. Small, flattened crystals showing prismatic and terminal planes are found in earthy decomposed pyroxene.

<sup>1</sup> *Am. J. Sci.* [4], 24, 252, 1907.

Also in small crystals with the phenacite resulting from decomposition of danalite.

*Siderite.* Pale-brown anhedral crystals as decomposition product of danalite.

*Sphalerite.* Associated with galenite in intergrown masses, and as stringers with chlorite penetrating feldspar along fractures. Also in the quarry between Rockport and Gloucester as a decomposition product of danalite.

*Tantalite.* There is in the Harvard collection a prismatic crystal of tantalite 25 mm. long imbedded in feldspar of the graphic-granite zone. Front and side pinacoids are well-developed and it is terminated with domes and basal pinacoid.

*Thorite.* Var. Orangite in orange-yellow grains is associated with cyrtolite.

*Yttracrite.* Reported by Sears as occurring on massive quartz at Rockport.

## NOTES AND NEWS

**SUPPLEMENTARY NOTE ON CRISTOBALITE.** AUSTIN F. ROGERS. *Stanford University.*—Since the manuscript of the writer's note on Cristobalite from Yellowstone National Park<sup>1</sup> was sent in for publication in the AMERICAN MINERALOGIST, this mineral has been recognized in a new locality in California. The statements made in that paper as to the probable frequent occurrence of cristobalite in medio-silicic rocks can therefore be emphasized by the addition, on page 6, of one each to the number of occurrences in California, in America, and in rhyolitic obsidian.

The following additional notes may be of interest. Iddings in the paper cited (p. 264, and Pl. 12, fig. 3) referred to certain minute pellets in the rock of Obsidian Cliff, which may well have been cristobalite. The thin sections of the specimens studied by the writer show in spots an intimate intergrowth of orthoclase and cristobalite. In addition to the mosaic structure and polysynthetic twinning of this mineral, it exhibits in section a peculiar curved fracture which seems to be characteristic of it, thus giving a further means for its recognition.

**A METHOD OF OBSERVING AIRY'S SPIRALS.** FRANK J. KEELEY. *Academy of Natural Sciences of Philadelphia.*—It may not be generally known that Airy's spirals may be exhibited with a *single* plate of quartz cut normal to the axis, by employing a vertical illuminator and a plane mirror just beneath the quartz plate. The objective used should have sufficient working distance to focus on the reflecting surface of the mirror and the vertical illuminator must be of the disc type. Under these conditions the optical figure may be seen in the back focal plane of the objective by merely looking down the tube through a Nicol prism, or it may be magnified by a secondary microscope in the tube. No polarizer is necessary, for the light reflected by the disc of the illuminator, even at the usual angle of 45°, is sufficiently polarized to show the figure fairly well; and, by tilting the disc more obliquely until it approaches the angle of maximum polarization, and raising the source of illumination correspondingly, the effect is quite as perfect as when a polarizer is interposed in front of the light.

<sup>1</sup> Published in *Am. Min.*, 6 (1), 4-6, 1921.



SAPPHIRES, ASTERIATED, FROM PLACEMAN'S CREEK, CENTRAL QUEENSLAND, AUSTRALIA. GEORGE F. KUNZ. *New York City*. Sapphires of a novel type have recently been found on the Excelsior Claim, 5 kilometers ( $3\frac{1}{2}$  miles) south of Ruby Valve, near Placeman's Creek, in central Queensland, Australia, near the Central Queensland Railroad. They are of blue color, not transparent, but show a well-defined (not movable) star-cross, due to crystallization. The star is bronze colored, in a field of deep blue. The star has frequently the exactness of a cross of Saint Andrew; and the ends of the cross terminate in the center of the hexagonal pyramids and not at the corners. They occur in alluvial soil, in a second layer of an old river channel. They are found in an alluvial deposit with rounded boulders called "Billybolas" from a few cm. up to 3 meters in length, but all rounded. The discovery dates from October, 1920. There is also reported, from some 40 km. (25 miles) above this region, the occurrence of a green, rolled, corundum crystal weighing over 50 grams; this, also, is not transparent.

SPHALERITE IN COAL PYRITE. LEONARD P. DOVE. *University of North Dakota*. An occurrence of sphalerite in coal pyrite (in part marcasite) in the Pan Handle mine at Bicknell, Indiana, has never been reported, so far as the writer knows. Mention has been made<sup>1</sup> of zinc in small amounts being shown by analyses of pyrite from this mine, but no details are given, hence it may be of interest to furnish a brief description of this rather unusual association.

The sphalerite is found in the knobby portions on the upper side of lenses or nodules of finely granular pyrite-marcasite. These nodules are fairly abundant in the lower few centimeters of the shale above the coal, and between the shale and the coal. While bands and lenses are fairly common in the coal itself, these do not seem to contain sphalerite. The coal bed is number VI of the Indiana Geological Survey.

The sphalerite occurs as grains from 1 mm. to 1 cm. in diameter as a filling between the larger granules of pyrite-marcasite. It occasionally includes grains of pyrite-marcasite. No sphalerite crystals with well defined faces were noted. The sphalerite is honey colored to rosin colored. The perfect cleavage faces of the sphalerite make a strong contrast with the dull faces of the pyrite-marcasite in reflected light.

Only about 10% of the non-selected nodules or lenses from the roof shales contain visible sphalerite, but selected specimens may contain as much as 20%. A rather careful estimate based upon about 6 kg. of pyrite-marcasite furnished by the Pan Handle Coal Company shows approximately 0.27% sphalerite, which would correspond to a zinc content of about 0.18%.

The *Engineering and Mining Journal* has recently published a discussion of the correct pronunciation of the term bauxite. Many Americans pronounce this bawksite, and some boxite; but there are also those who insist that, since the name is of French origin, the correct pronunciation is bozite. For a time

<sup>1</sup> Dove, 43d. Ann. Rept. Dept. Geol. and Nat. Res. Indiana, Year Book, 1918, p. 232.

those taking part in the discussion did not seem to get anywhere, but ultimately the well-known French-Canadian economic geologist, Dr. Th. C. Denis, pointed out that the French themselves pronounce it *bokseet*, which would appear to settle the matter. The English equivalent of this is *boksite*. (*Eng. Mining J.*, 110 (24), 1115, 1920.)

## PROCEEDINGS OF SOCIETIES

### PHILADELPHIA MINERALOGICAL SOCIETY

*Wagner Free Institute of Science, January 13, 1921*

A stated meeting of the Philadelphia Mineralogical Society was held on the above date with the president, Dr. Hawkins, in the chair. Fourteen members and eight visitors were present.

Dr. Henry Leffmann addressed the society on "Some methods of photomicrography for petrographic work," illustrated with numerous lantern slides. Mr. Robert J. Hagey exhibited and described a chart showing the classification and composition of the igneous rocks. A communication was read from Mr. Frank J. Keeley describing a method of exhibiting Airy's spirals with a single plate of quartz [see Notes and News.] Mr. Charles W. Hoadley exhibited arsenopyrite and rutile from Franklin Furnace, N. J.

SAMUEL G. GORDON, *Secretary*.

### NEW YORK MINERALOGICAL CLUB

The regular monthly meeting of the N. Y. Mineralogical Club was held at the American Museum of Natural History on Wednesday, January 19th, 17 members being present.

Mr. Paul Walther, of Elizabeth, N. J., was proposed for membership by W. H. Broadwell. Mr. Broadwell exhibited a specimen of native bismuth from New South Wales and also a specimen of molybdenite. Dr. Kunz exhibited some interesting star sapphires (see Notes and News). Mr. Walther exhibited two specimens from West Paterson, N. J. Mr. Grenzig reported having found a few years ago a specimen of calamine and a fossiliferous boulder near the site of the Brooklyn Museum building. Mr. F. I. Allen spoke entertainingly of the geology at the site of the new Cunard Building in lower Broadway. He described the glacial deposits of sand, silt, etc., and also the bed rock, exhibiting a specimen of same containing many small garnets.

Dr. Kunz spoke, as announced, on "Some reminiscences of the older mineral localities of New York and its vicinity." He stated that the first mineralogist he had met was the late B. B. Chamberlin, a wood engraver, and a fossil collector, from Cincinnati. Mr. W. E. Hidden, a bank note engraver, was also associated with the mineralogists of this period. Dr. Martin and Jas. B. McIntosh and S. C. H. Bailey were others active at this time. Dr. Kunz exhibited some of the older mineralogical books and pamphlets. A copy of the *Annals of the Lyceum of Natural History* was among these. It contained two early articles on local geology. One article was entitled "On the Mineralogy of New York Island," by S. C. H. Bailey, and the other, "Geology of York Island" by R. P. Stevens. These articles bear the date of 1865.



Dr. Kunz then spoke of the various city localities and the minerals found therein. He stated that the East Side, from 37 to 110 St., probably afforded the most specimens. The various tunnels and their minerals were spoken of.

Capt. Miller called attention to the fine collection of Brooklyn Drift Minerals and Rocks in the collection of the Long Island Historical Society. He also mentioned the occurrence of monazite and xenotime crystals, on the Speedway, Harlem River. Dr. Kunz emphasized the importance of complete records being kept of all finds. THOMAS I. MILLER, *Secretary Pro. Tem.*

## NEW MINERALS

It is proposed hereafter to indicate in a general way the classification of all new minerals recorded in this department. Subdivision will be first into "families," of which nine may be recognized, as listed in the January number (*Am. Min.* 6 (1), 12, 1921). Each family will be separated into "subfamilies" based on special features of composition. This arrangement is tentative and open to modification, and criticism of it will be welcome. [Ed.]

### FAMILY 2. SULFIDES, ETC.

#### SUBFAMILY 3. DOUBLE SULFIDES OF METALS AND SEMI-METALS.

##### ULTRABASITE

V. ROSICKÝ and J. STERBA-BÖHM. Ultrabazit, ein neues Mineral aus Freiberg in Sachsen. (Ultrabasite, a new mineral from Freiberg, Saxony). *Rozpr. české Akad. Prag*, 25, No. 45, 1916; *Z. Kryst. Min.*, 55, 430-439, 1920.

NAME: From its extremely basic chemical composition.

##### PHYSICAL PROPERTIES

Color black, somewhat grayish; luster metallic; streak black; cleavage none; fracture scaly, with somewhat greasy luster on the surface. H. = 5; sp. gr. 6.026.

##### CRYSTALLOGRAPHIC PROPERTIES

Orthonorhombic peri-tetragonal.  $a : b : c = 0.988 : 1 : 1.462$ . Habit thick-columnar, with vertical striations in the prism zone. Forms:  $a(100)$ ,  $b(010)$ ,  $r(210)$ ,  $m(110)$ ,  $g(230)$ ,  $n(130)$ ,  $i(015)?$ ,  $h(012)$ ,  $f(011)$ ,  $r(102)$ ,  $d(101)$ ,  $e(114)$ ,  $s(214)$ ,  $? (218)$  and  $? (126)$ . Dominant,  $m$ ,  $n$ ,  $d$ , and  $f$ . Most forms are incompletely developed; and there is some suggestion of twinning.

##### CHEMICAL PROPERTIES.

Decrepitates on heating, and at rather low temperature gives off white fumes. If finely powdered, slowly decomposed by HCl and HNO<sub>3</sub>, with the separation of some sulfur. Easily decomposed on fusion with alkali carbonates and nitrate. Gives tests for Pb, Ag, and Sb, with traces of Fe and Cu, but no As nor Sn. Some disturbing element was found to be present, which proved to be germanium, as shown by the formation of coatings of GeS, purple, near the mineral, and GeS<sub>2</sub>, white, distant, on heating in a stream of H<sub>2</sub>S. The Marsh test, as usually applied to As, gives a coating of Ge. Care must be taken, in analyzing, not to heat the mineral in contact with HCl, or the Ge will volatilize as GeCl<sub>4</sub>.

For quantitative analysis the mineral was treated with dil.  $\text{HNO}_3$ , evapd. to dryness, and taken up with  $\text{H}_2\text{O}$ , whereupon the Sb and Ge oxides remained insoluble. The solid was treated with 15%  $\text{KOH}$ , whereupon the Sb and Ge dissolved, leaving Pb and Ag insoluble. The Sb and Ge were turned into Na-sulfosalts, treated with dil.  $\text{H}_2\text{SO}_4$ , and the  $\text{Sb}_2\text{S}_3$  filtered off on a gooch crucible in a stream of  $\text{CO}_2$ . The filtrate was strongly acidified, and  $\text{H}_2\text{S}$  led in, the precipitated  $\text{GeS}_2$  being treated as was Sb. The sepn. is only approximate, but the best that could be done under the circumstances. The other elements were determined in the usual ways.

The composition proved to be: Ag 22.35, Pb 54.16, Cu 0.47, Fe 0.25, Sb 4.60, Ge 2.20, S 16.15, sum 100.18%. This is regarded as corresponding to  $11\text{Ag}_2\text{S} \cdot 28\text{PbS} \cdot 28\text{Sb}_2\text{S}_3 \cdot 3\text{GeS}_2$ , with 1.6 excess sulfur; or  $\text{Ag}_{22}\text{Pb}_{23}\text{Sb}_4\text{Ge}_3\text{S}_{53}$ . The mineral thus belongs toward the basic end of the sulfogermanates.

#### OCCURRENCE

Observed on two specimens collected by an English mineralogist, Walker, in 1829 and 1833, at the Himmelfurst mine, Freiberg. They show granite with a crust of quartz and rhodochrosite, on these galenite crystals, and still later the ultrabasic crystals, 8 x 5 mm. in size. Over the two last are tiny proustite crystals, and the whole is covered by a second generation of quartz.

#### DISCUSSION

[A somewhat simpler formula would be  $6\text{Ag}_2\text{S} \cdot 16\text{PbS} \cdot 2\text{GeS}_2 \cdot \text{Sb}_2\text{S}_3 \cdot \text{S}$ , or  $2 \times \text{Ag}_6\text{Pb}_8\text{GeSbS}_{16}$ . Theory: Ag 21.8, Pb 55.6, Ge 2.4, Sb 4.0, S 16.2, sum 100.0%. The ratio of basic sulfides to acidic ones is about 7 : 1, which brings the mineral between the divisions containing beegerite (6 : 1) and polybasite (8 : 1) in a classification based on this ratio.] E. T. W.

### FAMILY 7. PHOSPHATES, ARSENATES, ETC.

#### SUBFAMILY 1. ARSENITES AND RELATED COMPOUNDS.

#### ARMANGITE

G. AMINOFF and R. MAUZELIUS: Armangite, a new arsenite from Långbanshyttan. *Geol. Fören. Förh.* **42** (5), 301-309, 1920.

NAME: From its chief chemical components, arsenic and manganese.

#### PHYSICAL PROPERTIES

Color black, in microscopic sections brown to yellow. Streak brown. Form minute crystals.  $H = 4$ . Sp. gr. 4.23.

#### CRYSTALLOGRAPHIC PROPERTIES

Hexagonal, rhombohedral.  $c = 1.3116$ ,  $p_0 = 0.8744$ . Habit prismatic. Forms:  $c(0001)$ ,  $b(11\bar{2}0)$ ,  $p(11\bar{2}1)$ ,  $f(11\bar{2}2)$ . Cleavage poor parallel to  $c$ .

#### OPTICAL PROPERTIES

Uniaxial, —. Refractive indices higher than solutions of S in methylene iodide (1.79) but lower than S(1.93). Birefringence weak. No pleochroism.

#### CHEMICAL PROPERTIES

Essentially manganese ortho-arsenite,  $\text{Mn}_3(\text{AsO}_3)_2$ . (Theory MnO 51.8,  $\text{As}_2\text{O}_3$  48.2%). The mean of several analyses by Mauzelius on 0.5-0.8 gr. of



material gave:  $\text{As}_2\text{O}_3$  42.92,  $\text{Sb}_2\text{O}_3$  0.40,  $\text{PbO}$  0.32,  $\text{FeO}$  2.19,  $\text{MnO}$  45.06,  $\text{CaO}$  2.83,  $\text{MgO}$  0.49,  $\text{H}_2\text{O}$  0.71,  $\text{CO}_2$  5.08, insoluble 0.20, sum 100.20 per cent. The  $\text{CO}_2$ ,  $\text{CaO}$ ,  $\text{MgO}$  and some  $\text{FeO}$  are present as admixed carbonates.

#### OCCURRENCE

Occurs at Långbanshyttan, Sweden, where found by G. Flink in 1919, associated with calcite, barite, fluorite, hematite, and two minerals resembling pyroaurite (?) and ecdemite (?).  
S. G. G.

#### DISCUSSION

[May be accepted as a new species, but the composition must be regarded as inadequately established. To be placed in a group of phosphate-arsenate minerals abnormally low in  $\text{P}_2\text{O}_5$  or  $\text{As}_2\text{O}_5$ , or possibly containing  $\text{As}_2\text{O}_3$ .  
W. F. F.]

### FAMILY 7. PHOSPHATES, ARSENATES, ETC.

#### SUBFAMILY 8. SULFO-PHOSPHATES.

#### PHOSPHOPHYLLITE

H. LAUBMANN and H. STEINMETZ: Phosphatführende Pegmatite des Oberpfälzer und Bayerischen Waldes. (Phosphate-bearing pegmatites of the Upper Palatinate and Bavarian Forest Region). *Z. Kryst. Min.*, **55**, 523-586, 1920; this mineral, 565-568.

NAME: From the composition, a *phosphate*, and the marked cleavage into sheets (*phylla*).

#### PHYSICAL PROPERTIES

Colorless to pale bluish green; luster vitreous; transparent; cleavage c, perfect, also good on a and b.  $H. = 3-4$ ; sp. gr. 3.081.

#### CRYSTALLOGRAPHIC PROPERTIES

Monoclinic holohedral.  $a : b : c = 1.0381 : 1 : 1.7437$ ;  $\beta = 89^\circ 32'$ . Forms:  $a(100)$ ,  $c(001)$ ,  $q(011)$ ,  $k(012)$ ,  $g(021)$ ,  $s(102)$ ,  $\rho(\bar{1}01)$ ,  $\tau(\bar{1}03)$ ,  $\lambda(\bar{1}25)$ ,  $o(123)$ ,  $\omega(\bar{1}23)$  and  $\pi(\bar{1}21)$ . One type shows plates parallel to  $a$ , the other is more or less prismatic. The former is often, the latter always, twinned on  $c$ .

#### OPTICAL PROPERTIES

Mean  $n = 1.65$ ; birefringence 0.025. Axial plane b; cleavage flakes have the bisectrix outside the field of view.  $2E = 75^\circ$ ; sign —.

#### CHEMICAL PROPERTIES

Analysis by Dr. Spengel, after deducting 3.66% insoluble matter:  $\text{FeO}$  14.35,  $\text{CaO}$  5.42,  $\text{BaO}$  0.96,  $\text{MgO}$  12.75,  $\text{K}_2\text{O}$  9.00,  $\text{Al}_2\text{O}_3$  6.48,  $\text{P}_2\text{O}_5$  27.38,  $\text{SO}_3$  9.71,  $\text{H}_2\text{O}$  13.95, sum 100%. Some specimens contain Mn also. Suggested to correspond to  $3\text{R}_3\text{P}_2\text{O}_3 + 2\text{Al}(\text{OH})\text{SO}_4 + 9\text{H}_2\text{O}$ . [Since apparently formed under oxidizing conditions, much of the iron is probably ferric. Abstr.]

#### OCCURRENCE

A late development in cavities in corroded triplite at the pegmatite quarry at Habendorf. In this locality beside the usual pegmatite minerals (also

natrolite and sphalerite), triplite is very abundant; it contains 28.66% MnO and shows rough crystals agreeing approximately in angles with wagnerite. Triphylite is also present, showing 11.40 MnO. Both heterosite and purpurite occur as alteration products. Triploidite could be identified by its optical properties. Apatite is abundant, and analysis of one variety showed 4.93% MnO, making it a "manganapatite." Columbite in association with autunite is frequent. Secondary phosphates include vivianite (described crystallographically), dufrenite (called "kraurite"), cacoxenite associated with "xanthoxene" (described below), some fairfieldite (identified optically), phosphosiderite, and strengite. The new minerals phosphophyllite (above) and "phosphoferrite" (below) are associated with the last seven.

#### DISCUSSION

[May be accepted as a new species, altho the composition needs further study. It is evidently related to the beudantite group, especially to harttite,  $\text{SrO} \cdot 2\text{Al}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot \text{SO}_3 \cdot 5\text{H}_2\text{O}$ . This relationship may be brought out by writing the formula of phosphophyllite:  $\text{K}_2\text{O} \cdot 8(\text{Mg}, \text{Fe})\text{O} \cdot 3(\text{Al}, \text{Fe})_2\text{O}_3 \cdot 3\text{P}_2\text{O}_5 \cdot 2\text{SO}_3 \cdot 12\text{H}_2\text{O}$ , which requires about :  $\text{K}_2\text{O}$  6,  $\text{RO}$  28,  $\text{R}_2\text{O}_3$  20,  $\text{P}_2\text{O}_5$  28,  $\text{SO}_3$  11 and  $\text{H}_2\text{O}$  14%.]

E. T. W.

#### FAMILY 7. PHOSPHATES, ARSENATES, ETC. DOUBTFUL SPECIES.

##### Kreuzbergite

LAUBMANN and STEINMETZ, *op. cit.*, 551-552.

NAME: after the locality, the *Kreuzberg*.

##### PHYSICAL PROPERTIES.

Color, white to yellowish; cleavage pinacoidal (c). Sp. gr. 2.139.

##### CRYSTALLOGRAPHIC PROPERTIES

Orthorhombic holohedral.  $a : b : c = 0.3938 : 1 : 0.5261$ . Forms: b(010), o(111), q(011). The pyramid is dominant.

##### OPTICAL PROPERTIES

Mean  $n = 1.62$ ; birefr. = 0.02; optic axial plane (001);  $2V$  about  $90^\circ$ ; sign —.

##### CHEMICAL PROPERTIES

Only sufficient material for qualitative analysis was available. Chiefly an Al phosphate, with little Fe, Mn,  $\text{H}_2\text{O}$ , and doubtful F.

##### OCCURRENCE

Of late formation, in cavities in quartz, often on corroded earlier phosphates in pegmatite at the Kreuzberg of Pleystein. Among these, triplite was identified by its optical properties and an analysis, showing 25.42 MnO. Apatite of probable primary origin is present. The secondary phosphates form the following series: (1) Dufrenite (kraurite); (2) strengite, phosphosiderite, and the new mineral kreuzbergite; (3) vivianite, beraunite and cacoxenite; and (4) "Eisenpecherz" (colloidal iron hydroxide). The strengite crystals are described in detail;  $a : b : c = 0.8663 : 1 : 0.9776$ ; analysis gave



the normal formula,  $\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 8\text{H}_2\text{O}$ , altho there is a difficultly explainable excess of Fe. The phosphosiderite is also fully described;  $a : b : c = 0.5456 : 1 : 0.8905$ ; analysis agreed well with  $\text{Fe}_2\text{O}_3 \cdot \text{P}_2\text{O}_5 \cdot 7\text{H}_2\text{O}$ . The appearances of all the phosphate minerals in thin section are described.

In many respects this pegmatite resembles two others, of which full descriptions are given. That at Marchaney contains tourmaline, garnet, mica, sillimanite, staurolite, graphite, and various phosphates, the principal one being vivianite, with intergrown "kraurite" (dufrenite), and triplite.

That at Wildenau-Plössberg contains among other minerals beryl, pyrite and arsenopyrite. There are also large masses of triplite, and some secondary apatite, dufrenite, cacoxenite, beraunite, phosphosiderite, and strengite; a mineral in minute rhombic crystals with  $n = 1.60$  to  $1.65$ , probably reddingite; and also columbite and autunite.

#### DISCUSSION

Noted to be crystallographically distinct from lucinite. [But if  $a$  is doubled, gives  $a : b : c = 0.7876 : 1 : 0.5261$ , which is very close to childrenite,  $\text{Fe}''\text{Al}(\text{OH})_2\text{PO}_4 \cdot \text{H}_2\text{O}$ , with  $a : b : c = 0.7780 : 1 : 0.5258$ , and as it may well represent a variety of that species, with its properties somewhat modified by isomorphous replacement, it should not as yet be assigned species rank.]

E. T. W.

#### FAMILY 7. PHOSPHATES, ARSENATES, ETC. DOUBTFUL SPECIES.

##### Phosphoferrite

LAUBMANN and STEINMETZ, *op. cit.*, pp. 569-570.

NAME: from its composition, *phosphate* of iron (*ferrum*).

#### PHYSICAL PROPERTIES

In dense to columnar crystalline masses. Luster strongly greasy; color white to yellowish or pale greenish. Cleavage partial in one direction; fracture splintery to conchoidal.  $H = 4-5$ ; sp. gr. 3.165. Optically biaxial, +, otherwise similar to phosphophyllite (above).

#### CHEMICAL PROPERTIES

Analysis by Dr. Spengel gave, after deducting 5.13% insoluble matter: FeO 42.89, MnO 2.62, CaO 5.63, MgO 6.59,  $\text{P}_2\text{O}_5$  37.31, ign. 4.96, sum 100.00%. This is suggested to correspond to an acid phosphate,  $\text{H}_6\text{R}''_3(\text{PO}_4)_3$  [but the "ign." may be in part F.]

#### OCCURRENCE

In quartz, mica, sphalerite, and triphylite or triploidite, in the pegmatite at Habendorf.

#### DISCUSSION

[The data are insufficient to justify considering this species established. It is rather near sarcopside (*Am. Min.* 5, 99-102, 1920) which has RO 62,  $\text{P}_2\text{O}_5$  35 and F 5%, and it may be the hydroxy-representative of that mineral,  $\text{R}_7(\text{OH})_2(\text{PO}_4)_4$ .]

E. T. W.

## FAMILY 7. PHOSPHATES, ARSENATES, ETC. DOUBTFUL SPECIES.

**Xanthoxenite**LAUBMANN and STEINMETZ, *op. cit.*, 579-580. ("Xanthoxen").NAME: From the yellow color (Gk. *Xanthos*,) and the close relationship to *cacoxenite*.

## CRYSTALLOGRAPHIC AND OPTICAL PROPERTIES

In thin plates, under the microscope, seen to be monoclinic. Extinction angle  $36^\circ$ ; pleochroism strong. Birefr. about like that in *cacoxenite*, ( $n = 1.61$ ) but  $n$  higher. Axial angle,  $2E$ , about  $115^\circ$ . Sp. gr. 2.844.

## CHEMICAL PROPERTIES

Dissolves in acid readily. Could not be sufficiently separated from intergrown minerals for quantitative analysis. The  $P_2O_5$  content is 32.61%, and qualitative examination shows also Fe, chiefly ferric, also less Mn and Ca, with a little Al and Mg. There is 16.10%  $H_2O$ , which is lost only at a high temperature.

## OCCURRENCE

Intimately intergrown with *dufrenite*, and especially with *cacoxenite* in the mass of secondary phosphates, to some extent at Habendorf (see above under *phosphophyllite*) but especially at the quartz quarry at Hühnerkobel, Rabenstein. Here occur *beryl*, *muscovite*, "pseudo-triplite," *columbite*, abundant accessory *triphylite*, in part altered into *dufrenite*, etc. Another type of alteration is into *heterosite* and some *purpurite*. *Apatite* is present, also its alteration products; some *autunite* and *uranocher*. *Tourmaline* is rare. The secondary phosphates comprise *dufrenite*, *cacoxenite*, *vivianite*, rarely secondary *apatite*, and *fairfieldite*, (once called "*leucomanganite*"). This is determinable by its optical properties, and is probably what has been reported as "*wavellite*." *Phosphosiderite*, *strengite*, and *beraunite* are prominent.

## DISCUSSION

[The data are inadequate to establish this as a species. It approaches *beraunite* ( $P_2O_5$ , 31,  $H_2O$  16%) and may be a variety.] E. T. W.

## ABSTRACTS—MINERALOGY

THE MINERALS OF GLAMORGAN. F. J. NORTH. *Trans. Cardiff Nat. Soc.* **49**, 18-51, 1916-7.

An account of 31 species found in the county. Rare minerals reported include gold, *millerite*, *linneite*, *minium*, and *barytocalcite*. S. G. G.

STUDIES ON THE MINERALS, THE GENESIS, AND THE GEOLOGY OF DEPOSITS OF NITER. P. N. CHIRVINSKY. *Izv. Polyt. Inst. Novochoerkassk*, **5**, 36-64, 1916. [Russian with French abstract.]

A summary of data on the nitrate minerals, with descriptions of their occurrence, especially in Russia.  $KNO_3$ ,  $NaNO_3$ ,  $Mg(NO_3)_2$  and  $NH_4NO_3$  occur in Turkestan. W. F. H.



## NOTE ON A CORUNDUM FROM A NEW LOCALITY IN MEXICO.

CARLOS CASTRO. *An. Inst. Geol. Mexico*, **4**, 31-36, 1916-1917.

A report of an occurrence of emery at Fresnillo, Zacatecas, Mexico.

E. T. W.

## NICTAUX-TORBROOK IRON ORES, NOVA SCOTIA. A. O. HAYES.

*Can. Dept. Mines Summary Rept.* **1916**, 273-275, 1917.

A green iron silicate occurs in these ores both as spherules and as a cement. The magnetite seems to have resulted from alteration of the silicate.

E. V. Shannon.

IRON PROSPECT AT PIEDMONT, PICTOU COUNTY, NOVA SCOTIA. A. O. HAYES. *Can. Dept. Mines Summary Rept.* **1916**, 276, 1917.

A green iron silicate occurs largely as spherules built around quartz grains as a nucleus. The silicate is probably sedimentary.

E. V. Shannon.

## MAGNESITE AT ORANGEDALE, INVERNESS CO., NOVA SCOTIA.

A. O. HAYES. *Can. Dept. Mines Summary Rept.* **1916**, 217-18, 1917.

Friable weathered magnesite occurs as brown hexagonal prisms terminated by scalenohedra, associated with dolomitic limestone.

E. V. Shannon.

NASONITE FROM LÅNGBANSHYTTAN. G. AMINOFF. *Geol. Fören. Förh.* **38**, 473-476, 1916.This mineral has been known hitherto only at Franklin Furnace, but is now recognized in the secondary calcite veins at Långban. It occurs as hexagonal prisms with rounded faces, and in white to gray lamellar masses. Analysis showed its composition to agree with that of the Franklin Furnace mineral,  $\text{Pb}_5\text{Ca}_4\text{Cl}_2(\text{Si}_2\text{O}_7)_3$ . Its  $\omega = 1.945$  and  $\epsilon = 1.971$ .

E. T. W.

THE AGE OF THORIUM MINERALS. R. W. LAWSON. *Sitzb. Akad. Wiss. Wien*, **126**, IIa, 721-739, 1917; thru *Sci. Abstr.* **22A**, 165-166, 1919.

The age of some rare-earth minerals from Devon, England, and Brevik, Norway, as determined from the ratio between thorium and uranium, and uranium and lead, comes out between 8 and 300 million years. Thorianite from Ceylon gave 138-506 million years.

E. T. W.

THE FEDOROV METHOD AND ITS APPLICATION TO THE DETERMINATION OF THE FELDSPARS. R. SABOT. *Arch. sci. phys. nat.* **46**, suppl., 72-76, 1918; thru *Chem. Abstr.* **14**, 163-164, 1920.Plotting the properties of the feldspars leads to the conclusions: that a triclinic form of  $\text{KAlSi}_3\text{O}_8$  enters into the plagioclases; albite and Carlsbad twins predominate in deep-seated acid rocks; pericline twins predominate in deep-seated basic rocks; and in effusive rocks and veins, no matter what the composition of the magma, the Manebach, Esterel-Ala, and Baveno twins are most frequent.

E. T. W.

THE ALKALI FELDSPARS. EERO MÄKINEN. *Geol. Fören. Förh.*, **39**, 121-185, 1917.

A detailed study of the relation between temperature and the crystal form of potassium and sodium feldspars. At the lowest temps. the K feldspar is monoclinic, and at high temps. also monoclinic if over 30% of the K compound is present. The miscibility of K and Na feldspars is greater at high temps.

W. F. F.

THE EXISTENCE OF PSEUDOBROOKITE IN THE CAVITIES OF THE BASALTIC STALACTITES OF RÉUNION. A. LACROIX. *Bull. soc. franc. min.* **41**, 183-186, 1918.

Pseudobrookite was identified by its crystallographic-optical properties. It is of pneumatolytic origin. E. T. W.

THE IDENTITY OF IOCHROITE WITH TOURMALINE. A. LACROIX. *Bull. soc. franc. min.* **41**, 130-131, 1918.

The supposed distinct mineral "iochroite" from Finland proves to be optically identical with tourmaline, and it is thought that its analysis was erroneous. E. T. W.

PREHNITE FROM THE TATRA MOUNTAINS. W. PAWLICA. *Bull. Acad. Sci. Cracow, A*, **1916**, 54-59; thru *Neues Jahrb. Min. Geol.*, **1919**, I, Ref. 275-276.

Massive white prehnite occurs in veins in a granite on Mengesdorf Mt. Two analyses show its composition to be normal. It is of hydrothermal origin, and is in part altered to sericite and quartz. E. T. W.

DOLOMITE FROM LEOGANG, SALZBURG. O. GROSSPIETSCH. *Min. petr. Mitt.*, **34**, 68-70, 1917; thru *Neues Jahrb. Min. Geol.*, **1919**, I, Ref. 274.

An analysis of blackish gray acute rhombohedrons is given. E. T. W.

PRE-CAMBRIAN SEDIMENTARY ROCKS IN THE HIGHLANDS OF EASTERN PENNSYLVANIA. EDGAR T. WHERRY. *Bull. Geol. Soc. Am.* **29**, 375-392, 1918.

This petrographic paper includes mention of the occurrence of crystals of sillimanite up to 1 cm. in diameter, formed by recrystallization from a pegmatite magma. E. T. W.

FIELD RELATIONS OF LITCHFIELDITE AND SODA-SYENITES OF LITCHFIELD, MAINE. REGINALD A. DALY. *Bull. Geol. Soc. Am.* **29**, 463-470, 1918.

A report of the discovery in place of the famous sodalite-cancrinite rock, by which the latter mineral is represented in all collections; it had heretofore been found only in glacial boulders. The formation of these alkali-rich minerals was evidently connected with the action of magmatic gases. E. T. W.

FLUORSPAR IN THE ORDOVICIAN LIMESTONE OF WISCONSIN. RUFUS M. BAGG. *Bull. Geol. Soc. Am.* **29**, 393-398, 1918.

Purple fluorite occurs in limestone at Neenah. Its deposition was relatively recent. E. T. W.

MAX BAUER. R. BRAUNS. *Centr. Min. Geol.*, **1918**, 73-84, 1918.

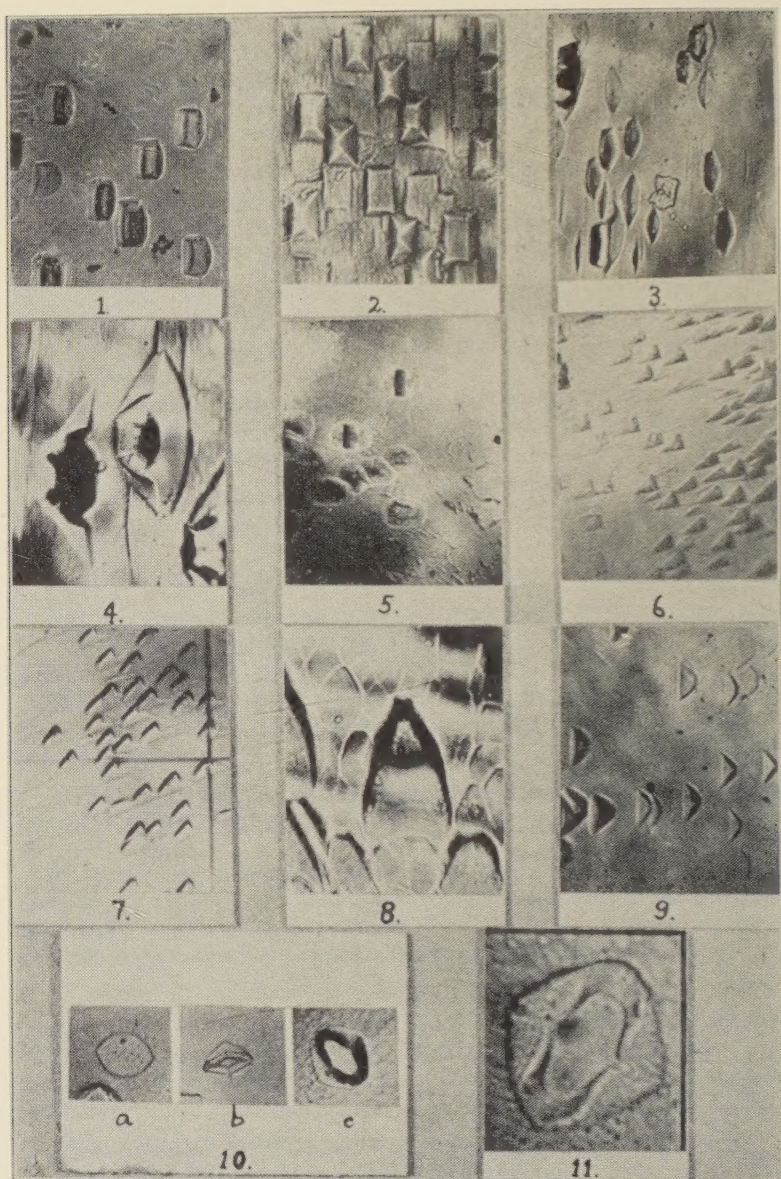
An obituary notice, with an extended bibliography. E. T. W.

RECENT ADVANCES IN SCIENCE—MINERALOGY AND CRYSTALLOGRAPHY. ALEXANDER SCOTT. *Science Progress*, **12**, 399-405; **13**, 38-43, 1918.





PLATE 3.



*Photographs by Arthur P. Honess*

ETCHING FIGURES OF TOPAZ.

Nos. 1, 2, 4, 5, 6, 8, 9, and 10, are  $\times 180$ ; 3 and 7,  $\times 120$ ; 11,  $\times 310$ .